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Integration Note

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Prepared by OS Integration Engineering

Compaq Computer Corporation

Contents

Overview **3**
Evaluating Compaq Data Center Solutions **3**
Target Audience 3
Key Features: Windows 2000 Datacenter Server OS 3
Certifying Windows 2000 Datacenter Server **4**
Datacenter OEM Requirements 4
Compaq Data Center Solution Certification 5
Application Certification 7
Hardware Certification 7
Change Management 7
Evaluating Compaq Data Center Solutions **11**
Features 11
Hardware 14
Software 16
Implementing the Compaq Data Center Solution **17**
Installation 17
Restrictions 24
Troubleshooting 24
Appendix A–Compaq Web Resources **27**
Appendix B-Microsoft Web Resources **27**

Evaluating and Implementing Compaq Data Center Solutions for Microsoft Windows 2000 Datacenter Server

Abstract: Compaq leads the way in revolutionizing the economics of enterprise computing with reliable, stable industry-standard solutions for the data center. The powerful combination of ProLiant Servers, StorageWorks and SANworks Enterprise Storage solutions, Intelligent Manageability tools, and an industry-leading portfolio of lifecycle services uniquely positions Compaq to deliver the total Data Center solution.

Compaq recognizes that data center customers require the highest level of reliability and stability as well as scalability in their solutions because they run business critical applications. Data center customers cannot afford downtime. Compaq provides a fully stress tested solution which includes the servers, operating system, storage and applications. We do not stop with a reliable and stable solution. Compaq knows that it is important to strictly maintain the solutions over the product lifecycle to ensure continuing stability, so we have implemented a unique change management program specially modeled for the data center. We are confident in our data center solutions and are backing it up with combined support for the server and operating system as well as cooperative support agreements with application vendors. Compaq is your one-stop shopping and support provider for reliable and stable data center solutions, meeting industry standards.

This integration note includes certification and change management information, installation instructions, and do's and don'ts for implementing Compaq Data Center Solutions.

Help us improve our technical communication. Let us know what you think about the technical information in this document. Your feedback is valuable and will help us structure future communications. Please send your comments to: CompaqNT@Compaq.com

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Evaluating and Implementing Compaq Data Center Solutions for Microsoft Windows 2000 Datacenter Server
Integration Note prepared by OS Integration Engineering

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Overview

The Microsoft Windows 2000 Datacenter operating system is available only through certified original equipment manufacturers (OEMs)—Compaq being the first OEM to be certified by Microsoft.

Kernel mode components in an application place a file with a .SYS extension in the system32 directory of your server. See Table 4 for a link to the full process for determining kernel mode components.

The Compaq Datacenter Program integrates hardware, software, and service into one powerful centralized business solution. Compaq certifies all hardware and software elements touching the kernel elements (i.e., software drivers). Compaq has met the stringent requirements established by Microsoft including scalable hardware, joint support teams, and rigorous testing and qualification focused on the entire system. Compaq exceeds the requirements by adding certification for Compaq StorageWorks and SANworks, implementing a unique change management model for lifecycle data center solution support, running additional stress tests with enterprise applications loaded, and providing additional support offerings such as the 99.99% uptime guarantee.

Evaluating Compaq Data Center Solutions

The following sections discuss the target audience for Compaq Data Center Solutions and the important features of the Windows 2000 Datacenter operating system (OS).

Target Audience

Any business wanting to increase levels of reliability, availability, and scalability for its business-critical applications is an ideal candidate for deploying a Compaq Data Center Solution. These solutions are specifically for customers running business critical solutions. Ideal customers include:

- Enterprises with critical ERP, data warehousing and messaging/collaboration applications that have high transaction volumes and physical distribution of resources across many sites.
- Application Service Providers (ASPs) deploying, hosting, implementing, and supporting applications from a centrally managed facility across a wide area network (WAN).
- Dot-coms with requirements for high availability and security, including site integrity and data protection.
- Education, environmental analysis, Public Safety and GIS can benefit from the enormous performance scalability, storage capacity, and high availability capacity of the Compaq Data Center Solution. These segments leverage huge amounts of imagery data.
- Fortune 500 companies with large unpartitionable databases.
- Companies requiring more "head room" than available with Windows 2000 Advanced Server.

Key Features: Windows 2000 Datacenter Server OS

Designed for the most demanding levels of availability and scalability, Windows 2000 Datacenter Server includes the following key features:

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- Windows 2000 features, such as Active Directory
- Enhanced 4-node clustering
- Support for up to 64 GB main memory (vs. 8 GB for Windows 2000 Advanced Server)
- Support for up to 32-way Symmetric Multiprocessing (SMP) (vs. 8 processors for Windows 2000 Advanced Server)
- Compatible with the Windows 2000 Datacenter Hardware Compatibility List (HCL)
- Support for Winsock Direct, which streamlines communications between distributed components
- Provides a VI System Area Network (SAN)

Table 1 shows a comparison between the Windows 2000 operating systems.

Table 1. Windows 2000 server operating systems

Feature	Windows 2000 Server	Windows 2000 Advanced Server	Windows 2000 Datacenter Server
Processor limit	4	8	32
Memory support	4 GB Intel	8 GB Intel Physical Address Extensions (PAE)	64 GB Intel (PAE)
Network Load Balancing	No	Yes (maximum 32 nodes)	Yes (maximum 32 nodes)
MSCS Server clustering	No	Yes (maximum 2 nodes)	Yes (maximum 4 nodes)
Job object	Job Object API	Job Object API	Process Control tool
Winsock Direct	No	No	Yes
Hardware Compatibility List	Yes	Yes	Datacenter HCL

Certifying Windows 2000 Datacenter Server

The certification process involves meeting stringent requirements set by Microsoft, and for Compaq, exceeding these requirements is key to achieving the total Data Center solution. Compaq extends the 14-day stress test by adding external storage to the systems in certification and adding applications with kernel level drivers such as backup, management, and virus protection software.

Datacenter OEM Requirements

Windows 2000 Datacenter Server and service pack updates can only be purchased through an OEM vendor certified by Microsoft. Because of the need for reliability and accountability, Microsoft set stringent requirements for OEM vendors to participate in Windows 2000 Datacenter.

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The Datacenter OEM requirements along with details on how Compaq exceeds these requirements are included in Table 2.

Table 2. Compaq exceeds Datacenter OEM requirements

Datacenter OEM Requirements		How Compaq Meets/Exceeds Requirements
Reliability with Datacenter HCL testing of all components		Compaq exceeds the requirements by adding external storage (StorageWorks) to the certification
Availability through 4-node clustering		Compaq meets this requirement
Operate an Authorized Microsoft Certified Support Center (MCSC) in each country in which the OEM sells a Datacenter solution		Compaq exceeds by being a Worldwide MCSC – competitors are only MCSC in the locations in which they sell Windows 2000 Datacenter
Accountability requirements for the OEM delivering Datacenter preinstalled on its system	▪ Offer four-hour response time 24x7	Compaq exceeds with a two-hour offering
	▪ Provide minimum 99.9% uptime guarantee offering	Compaq exceeds with availability reviews and a 99.99% uptime offering
	▪ Furnish a joint support queue with Microsoft	Compaq exceeds with a dedicated physical location for our joint support queue and matching Microsoft support personnel for every Compaq support personnel

Compaq Data Center Solution Certification

The Compaq Data Center Solution exceeds all the requirements established by Microsoft to provide a deployment strategy to meet your application and environment needs. Compaq has the people, the technology, the experience, and the commitment to deliver proven industry-standard computing to the Data Center.

Microsoft certified Compaq as the first OEM to offer solutions for Windows 2000 Datacenter and Compaq opened the first Joint Support Center with Microsoft on May 24, 2000.

If your application places a file with a .SYS extension in the system32 directory of your server, then your application has a kernel mode component. See Table 4 for a link to the full process for determining kernel mode components.

Certification involves the complete solution, not just the components. All kernel-touching elements, along with the hardware pieces, are part of the certified package. Compaq delivers the highest levels of reliability and stability possible through the Datacenter certification program and change management process.

High-availability features within ProLiant servers and StorageWorks storage systems deliver access to mission-critical data. The new Datacenter support infrastructure, including a Joint Support team from Compaq and Microsoft, ensures customers have a single point of accountability for fast problem resolution. To achieve highly reliable and available solutions, the Compaq and Microsoft Datacenter programs require fixed, certified configurations with extensive testing to enable the special customer services offerings available with the program.

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For more information on the Compaq Data Center testing and certification, see http://www.compaq.com/solutions/datacenter/application.html and http://www.veritest.com/mslogos/windows2000/compaq/.

Figure 1 presents a graphical representation of the rigid software and hardware certification process for Compaq Data Center Solutions.

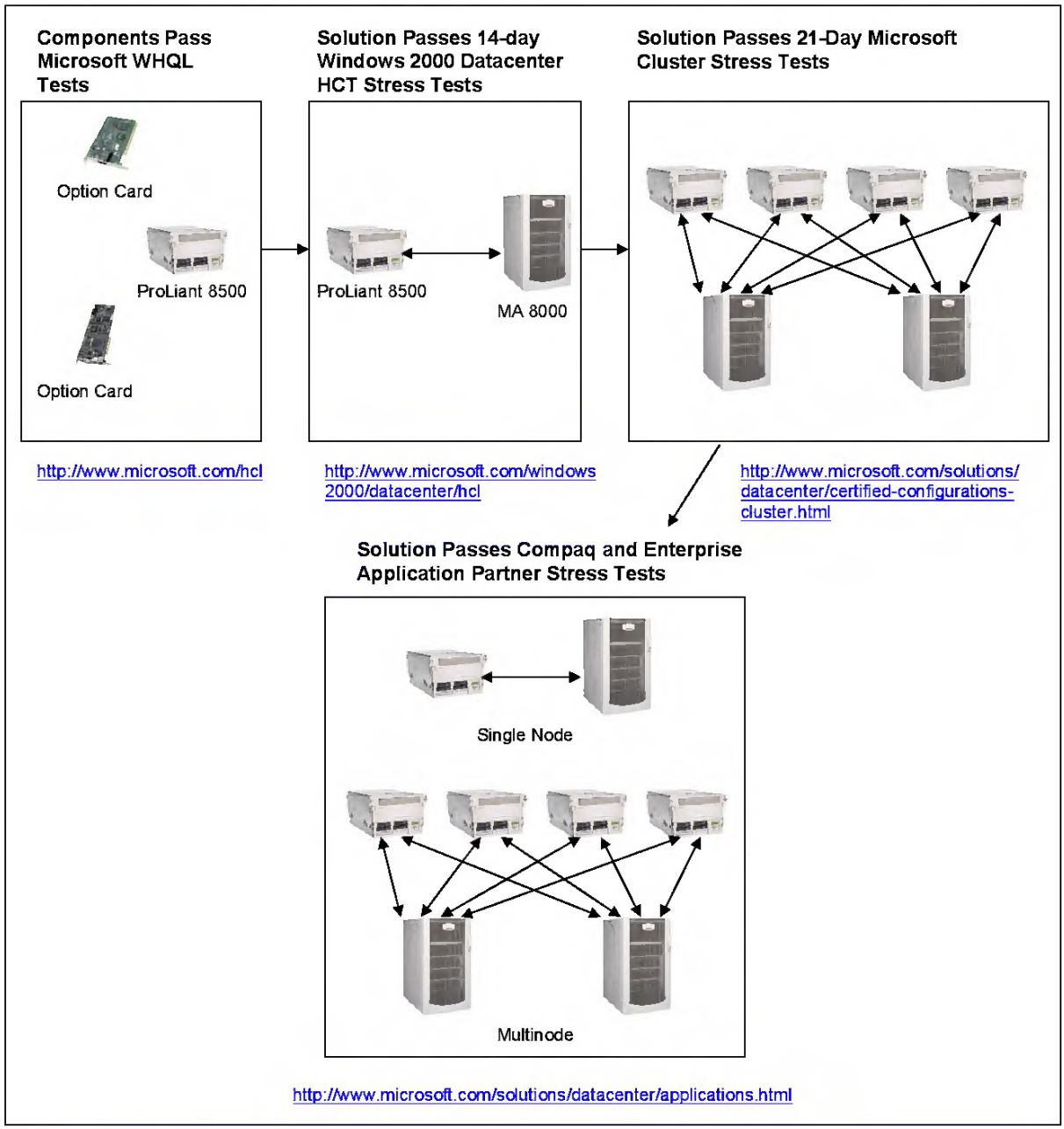

Figure 1. Rigid certification for Compaq Data Center Solutions

The following sections detail the software and hardware certification process.

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Application Certification

Application certification is only required for kernel touching applications (i.e., applications with software drivers). Applications that deposit a kernel-mode driver such as management, backup, and virus protection software, are certified by running the Hardware Compatibility Test (HCT) in the Bellevue, WA Windows 2000 Datacenter Certification Lab. Passing applications are included in the Microsoft Hardware Compatibility List (HCL) (http://www.microsoft.com/hcl/default.asp) and listed on the Compaq Data Center website (http://www.compaq.com/datacenter).

In addition, Compaq believes that extending the Data Center value proposition beyond the platform and operating system to the applications is key. To this end, Compaq has been working closely with targeted enterprise application vendors to stress the complete solution—ProLiant 8500, Windows 2000 Datacenter Server, and the application in single node or in clustered configurations.

Compaq works with enterprise application vendors to coordinate software releases on 6-month cycles with the hardware and operating system updates. Information about Compaq Data Center Solutions and additional stress testing can be found at http://www.compaq.com/datacenter.

Microsoft provides a Windows 2000 Datacenter Server application logo program detailed on the Microsoft website (http://msdn.Microsoft.com/certification) and on the VeriTest website (http://www.veritest.com/). Compaq feels strongly about the importance of running the certification tests on ProLiant servers, so we have invested millions of dollars in providing ProLiant 4-node clusters to each of the VeriTest labs around the world. Compaq is the exclusive 8-way server provider for VeriTest Windows 2000 Datacenter testing; therefore, customers can be confident that applications receiving the Microsoft Datacenter Server logo have been thoroughly tested on ProLiant servers.

Hardware Certification

Compaq hardware provided in the Compaq Data Center Solution achieves certification from the Microsoft Windows Hardware Quality Lab (WHQL), a test program ensuring the compatibility of vendor hardware with Microsoft operating systems. This certification process requires that hardware vendors like Compaq use WHQL test kits for the qualification of complete Data Center Solution bundles. Qualifying WHQL results enable vendors to obtain Microsoft Windows logos and to join the Microsoft Hardware Compatibility List (HCL).

Change Management

Compaq leads the change management process across all hardware and software elements of the Data Center solution. As a customer, you have the ability to plan on regularly scheduled updates that have been rigorously tested against your fixed configurations. Therefore, you can deploy your solutions with confidence.

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Benefits

Figure 2 below shows the release cycles for software included in traditional environments. In this case, an administrator must constantly manage changes in his/her environment to incorporate necessary software upgrades.

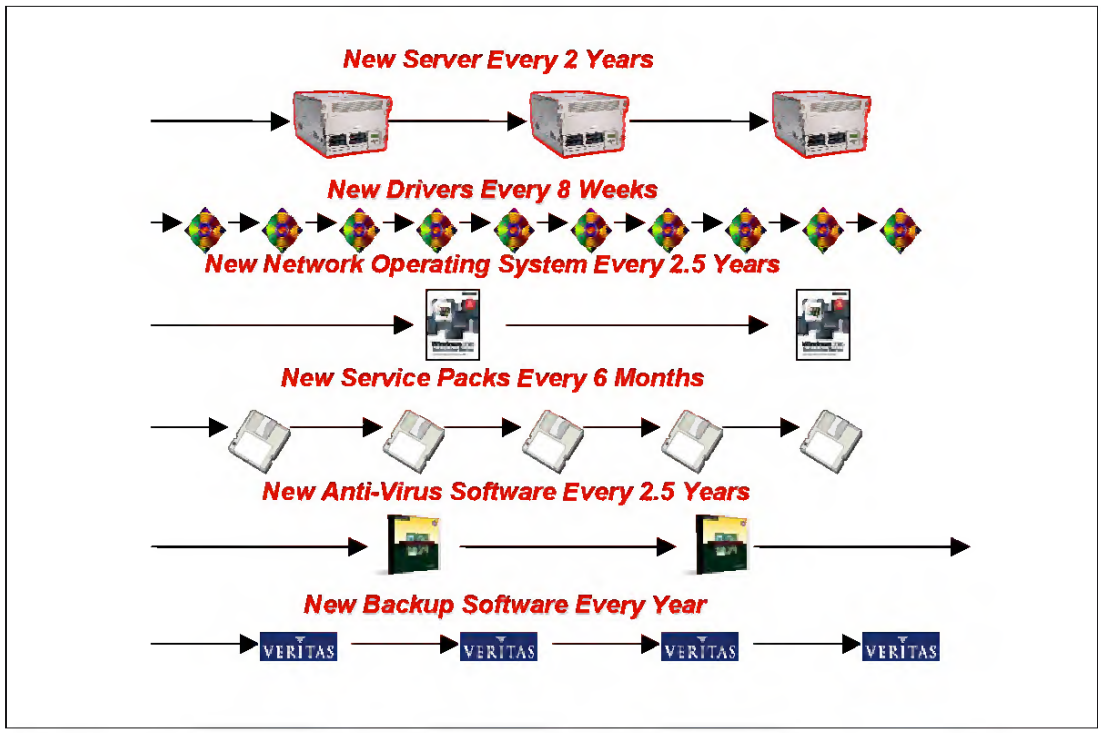

Figure 2. Customers managing change in a traditional environment

Baselines are specific hardware and software components comprising the Compaq Data Center Solution.

With the Compaq Data Center Solution, we manage the change for you, bundling everything you need into one complete solution. You can choose to receive the latest baselines to obtain access and support for updates, bug fixes, and new options, or sit on your configuration for up to two years—the decision is yours. Of course, the solutions are supported for their complete lifecycle, but you may be required to upgrade the server with a newer change management release if it is older than two years.

All changes to the Compaq Data Center Solution are stress tested together on the specific model to ensure optimal compatibility within your data center environment. Each year we release a fully tested new server model and every 6 months we release baselines for these server models.

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Figure 3 conceptually shows the change management relationship.

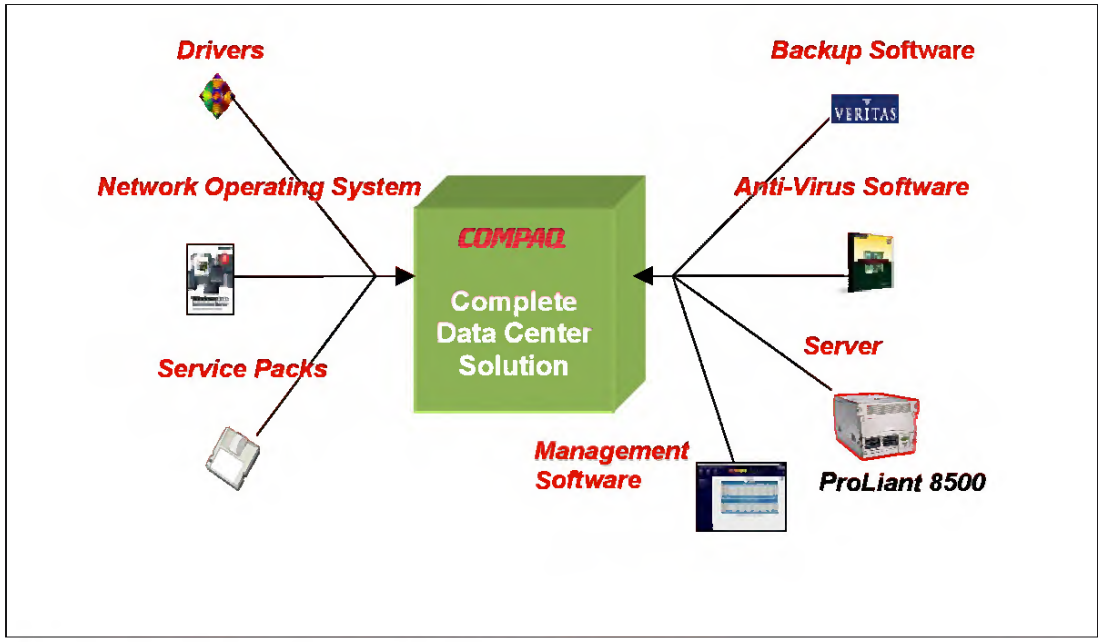

Figure 3. Compaq managing the change for you

Process

All Compaq Data Center Solution components, including hardware, firmware, and software, are fixed upon certification with a guaranteed lifecycle of two years and remain under strict change control.

This process pertains to all monitored components of the solution such as the following:

- All hardware and firmware revisions pertaining to the Compaq Data Center Solution
- Addition of a new qualified vendor for a particular Compaq Data Center Solution part
- Changes to Compaq Data Center Solution spare parts
- Any SoftPaq or ROMPaq for Compaq Data Center Solution drivers, utilities, or ROMs/BIOS
- New versions and revisions of Compaq Data Center Solution software

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- Any previously uncertified software or hardware to be added to a Compaq Data Center Solution
- Maintenance releases of Windows 2000 Datacenter Server (i.e., Microsoft Service Packs)
- New releases of the operating system

All changes are combined and recertified using the 7-day Windows 2000 Datacenter stress test. These combined packs of changes are released to customers on a 6-month schedule (in January and in July) so customers may easily schedule their server updates.

Baselines

The specific components released in the Compaq Data Center Solution are part of a two year protected baseline. Each component is obtainable and/or updateable for up to two years after the Compaq Data Center Solution release to address customer issues. This availability affects options, spares, and software. After establishing a baseline, the list of core components and options certified as part of that baseline become fixed. New hardware and software made available after a baseline release must wait until the next planned update, which occurs every 6 months, to be included as part of a certified Compaq Data Center Solution baseline.

Benefits

Baselines, including a certified collection of software components for the Compaq Data Center Solution, are released in 6-month intervals, allowing you to control your environment by minimizing the rate of change.

Compaq conducts a full certification—going beyond the defined Microsoft certification standards—for the latest component updates and new, applicable options, including Microsoft Service Packs, resulting in a new certified baseline that you can adopt in your environment as desired. Baselines provide access and support for updates, bug fixes, and new options. Compaq offers an upgrade kit to facilitate moving from one baseline to the next.

In order to protect your data center environment, Compaq includes provisions to the 6-month interval release cycle for two reasons: (1) to update anti-virus software and (2) to update critical software bugs.

Anti-Virus Software

Anti-virus software requires continuous asynchronous updates due to the fact that new viruses are constantly being released. Updates typically come in two forms: (1) virus definition files and (2) pattern files. Both forms do not affect the kernel or any certification involving the anti-virus product and engine updates. In many cases, companies want to remain as current as possible for all anti-virus updates on the systems they have deployed; therefore, it is essential that anti-virus updates be permitted for all systems, including Data Center solutions. Compaq Data Center Solutions provide this flexibility.

Compaq works closely with anti-virus vendors to ensure any product updates affecting the Datacenter certifications are re-certified as quickly as possible.

Symantec Norton Antivirus, Computer Associates InoculateIT, and Trend Micro ServerProtect are currently certified anti-virus software vendors supported by the Compaq Data Center Solution. Compaq plans to certify McAfee Virus Scan, NAI Netshield, and others in following releases. Additional updates and schedules will be maintained on http://www.compaq.com/datacenter.

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Emergency Patch Process

Non-critical bug fixes and driver revisions are provided as part of a certified planned baseline update for the Compaq Data Center Solution. In case of an extremely serious field issue that carries an unacceptably high risk to a customer's operations, a "hot fix" (i.e., SoftPaq, Hot Fix, Quick Fix Engineering Patch (QFE), or similar update) will be issued against the installed baseline.

This type of hot fix will be a mandatory update for all at-risk customers running that baseline, redefining the baseline. The emergency fix will be quickly certified by Compaq in the 24x7 Compaq Data Center Certification Lab and released to customers. Compaq will work closely with customers to perform an update on their solutions to preclude any loss of data.

Evaluating Compaq Data Center Solutions

Compaq leads the way in revolutionizing the economics of enterprise computing with reliable, stable industry-standard solutions for the data center. The powerful combination of ProLiant Servers, StorageWorks and SANworks Enterprise Storage solutions, Intelligent Manageability tools and an industry-leading portfolio of lifecycle services uniquely positions Compaq to deliver the total Data Center solution.

Features

Due to the critical need for reliability in the large enterprise, all elements touching the Windows 2000 Datacenter kernel must be certified by Microsoft. The Windows 2000 Datacenter solution offered by any OEM must include certified hardware, software, and services. Testing, training, and experience provide the basis for certification under this Microsoft program.

The Compaq Data Center Solution exceeds the Microsoft requirements by adding features and processes, such as:

- Compaq Scalability

  Compaq uniquely offers both scale-out and scale-up architecture with the 8-way ProLiant 8500 Data Center Server.

- Compaq Reliability

  Compaq extends the reliability of its solution by including StorageWorks hardware and SANworks software in each Compaq Data Center certified solution.

  Compaq includes kernel-touching applications in the Data Center certification runs. Compaq also completes a cooperative support agreement with kernel-touching independent software vendor (ISV) applications so customers can receive complete support for their hardware, operating system, and software from the Compaq Data Center Support Center.

  For continued system reliability, Compaq implemented a stringent change control program for the Compaq Data Center Solution. We collect all hardware and software and run the combination of changes through a 7-day stress test. The certified set of changes releases to customers in 6-month intervals.

  Compaq is the exclusive 8-way server vendor for the Microsoft Windows 2000 Datacenter logo administered by VeriTest. When an application receives the Datacenter logo, customers can rest assured that the application was tested on Compaq ProLiant 8500 Data Center 4-node cluster.

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- Compaq Availability

  The Compaq ProLiant HA/F500 4-node cluster for Datacenter provides increased availability and server utilization over current 2-node cluster offerings. In a 4-node environment, clusters can be configured to provide for multiple failures, and still offer 24x7 access to applications and data.

  With disaster tolerant configurations, Compaq offers stretch clustering with the Compaq ProLiant 8500 Data Center Solution. This unique combination of Windows MSCS failover functionality with StorageWorks Data Replication Manager (DRM) software, nodes, and storage can be placed at extended distances from each other. In case of site failure, client access to applications and data can be back on line in minutes, not hours or days.

  Availability Services

  Microsoft Windows 2000 Datacenter running on Compaq ProLiant systems provides a robust and reliable platform for demanding business environments. However, research shows the best systems alone cannot guarantee high availability. In fact, failures in hardware and operating systems cause only a small percentage of outages. More important are issues of interoperability and IT management practices.

  Compaq Global Services takes a holistic approach toward availability by going beyond the platform to address *all* the domains affecting availability in the customer's environment—not only the hardware and operating system, but also applications, the network, the physical environment, and IT management practices.

  - Assessment Service

    To achieve maximum availability, customers must plan and build availability into every facet of their environment. The Availability Assessment service helps them understand and enhance the high availability characteristics of their Compaq Data Center Solution—including the operating environment as well as the Compaq ProLiant server hardware and StorageWorks technology.

    A business critical consultant reviews the customer's proposed solution, business objectives, availability targets, and IT operations infrastructure. The consultant examines each of the 6 domains affecting availability, comparing them to best practices and identifying potential risks.

    Using sophisticated modeling tools, the consultant creates a model that shows the availability levels the customer can expect from the proposed hardware and software platform. The consultant identifies risk areas and proposes changes to the existing platform and IT operations to reduce risk.

    After gathering all the data, the consultant reports to the customer's team, summarizing the findings and making recommendations for addressing areas of potential downtime risks.

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- Availability Review

  Using the same method as the Availability Assessment, this service goes further, analyzing the entire IT environment in greater depth. The consultant determines the cost of downtime per system. Customers gain a thorough understanding of their environment to eliminate downtime risks. Availability Review also provides the cost justification data needed to budget technology and service investments based on the revenue impact of their systems.

- Availability Partnership

  Compaq works closely with the customer over time to develop and implement a fully customized plan for maintaining their target availability levels and ensuring uninterrupted computing. The service includes assessing and managing planned and unplanned change, such as migrations, upgrades, business growth, or mergers. We achieve this with careful contingency planning as well as availability monitoring that uses advanced tools and techniques.

  Through the Availability Partnership, we can work with customers to put an uptime guarantee in place for their Windows 2000 Datacenter solution.

- Uptime Guarantee for Windows 2000 Datacenter

  Compaq offers guarantees of up to 99.99% Uptime for a Windows 2000 Datacenter clustered configuration on a certified Compaq ProLiant platform.

  Uptime, defined as the availability of the core Windows 2000 Datacenter system to run applications, is achieved through an ongoing partnership with Compaq:

  - We recommend a specific Windows 2000 Datacenter cluster configuration.
  - The customer is required to have high-availability services in place: Windows 2000 Data Center Enterprise Support Plan, 24x7; Availability Review; Availability Partnership; and Installation and Startup Service.
  - The customer implements Compaq-specified serviceability actions as well as recommendations for reducing risk.
  - There may be other requirements based on local review.

  The customer pays only for the prerequisite services. There is no additional charge for the Uptime Guarantee.

  The Uptime Guarantee demonstrates our commitment to our customers' success and our confidence in the Compaq Data Center Solution.

- Compaq Accountability and Support

  The best and most complete lifecycle services in the industry are available from Compaq Services. Backed by the largest group of certified Microsoft Specialists in the world and incorporating proactive support and customer-specific technical account management, Compaq Services prevents problems before they occur. This world-class team has first hand knowledge of how to support Data Center customers with:

  - 28,000 service professionals
  - Service delivered in more than 200 countries
  - 24 x 7 business critical support

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- 60,000 partner sales and support specialists
- Alliances with eBusiness industry leaders
- 20,000 networking infrastructures delivered
- Innovative eServices delivery capabilities
- Robust set of high-end security services
- NonStop™ eBusiness lifecycle services
- Unmatched technical expertise

The new Windows 2000 Datacenter support infrastructure, including the Joint Support Team from Compaq and Microsoft, ensures customers have a single point of accountability for fast problem resolution. Additionally, these issues will receive the highest priority when escalated to the Microsoft Datacenter Solutions engineering, Critical Problem Resolution (CPR) and Quick Fix Environment (QFE) teams.

The Data Center Enterprise Support Plan can be purchased through Compaq or from your reseller as a CarePaq. For more information, contact your Compaq sales representative or e-mail us.

Support Centers

Utilizing the industry-leading Compaq Support Centers that include the largest number of Certified Microsoft Specialists in the industry, Compaq will deliver unparalleled support to Datacenter customers. Through the Datacenter support team, you will have a single point of contact for issues associated with your hardware and operating system. If *escalation* is necessary, the joint Compaq/Microsoft support team will own problem resolution, providing quick relief and, when required, prioritized quick-fix engineering for both operating system and hardware issues. Compaq already provides support for many of the leading software applications, including Microsoft applications, SQL Server, and Exchange.

The joint Compaq and Microsoft Support Team provides a *second-level escalation* point for both hardware and software support issues, and is located in the Compaq Data Center Solutions Lab in Bellevue, Washington. At this lab, Compaq has certified configurations for each of the Windows 2000 Datacenter solutions to enable support teams to replicate and diagnose problems more quickly than ever before.

As the only worldwide authorized Prime Integrator for Microsoft Windows 2000 platforms and as the Microsoft Global Services Partner of the Year 2000, Compaq is uniquely qualified to deliver comprehensive data center solutions.

Compaq Global Services offers planning, design, implementation, installation and startup, availability, and management and security services.

Hardware

Compaq leads the way in revolutionizing the economics of enterprise computing with reliable, stable industry-standard solutions. The Compaq Data Center Solution combines the ProLiant 8-way server platform with StorageWorks and SANworks products for a complete hardware strategy.

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ProLiant Server Platform

With the Compaq Data Center Solution, you have the ability to scale out or scale up by choosing the ProLiant 8500 Data Center Server. The features of this server are highlighted below.

The Compaq ProLiant 8500 Data Center server is clusterable today!

As part of the Compaq Data Center Solutions Program, each ProLiant 8500 Data Center server undergoes a rigorous certification process and includes change control to maintain stability.

The ProLiant 8500 Data Center Solution has the following key features:

- Windows 2000 Datacenter Server operating system (OS) pre-installed (8P license) and an OS Recovery CD-ROM to restore the server to factory state
- Four Intel Pentium III Xeon 700-MHz–2MB processors (supports up to eight processors)
- 4 GB memory standard
- Four 18.2-GB Wide Ultra3 SCSI 10,000 rpm 1-inch hard drives standard (preconfigured RAID 0+1 for high reliability)
- Compaq Remote Insight Lights-Out Edition
- 7U rack-optimized design

The new 8-way system architecture is driven by the Profusion chipset co-developed by Compaq, Intel, and Corollary, as well as Intel Pentium III Xeon processors. For more information, refer to the white paper entitled Compaq ProLiant 8500 Server Technology

- Compaq, Intel, and Corollary co-developed Profusion architecture
- Offered in two node and four node clusters

By adding additional memory and processors, the maximum performance of the ProLiant 8500 Data Center model may be realized. The maximum solution has been completely stress tested and certified in the Compaq Data Center Certification Lab.

For further information on the ProLiant 8500 Data Center Solution, refer to the Compaq website, http://www.compaq.com/products/servers/proliant8500dc/index.html.

Compaq Storage Solutions

The StorageWorks hardware and SANworks software in the Compaq Data Center Solution takes storage availability to a higher level by integrating certifying, testing, and delivering a fully configured storage environment. The Compaq Data Center Solution includes the following StorageWorks hardware and SANworks software:

- StorageWorks Modular Array 8000/Enterprise Modular Array 12000
- Storage Area Network (SAN) infrastructure
- SANworks Secure Path v3.1
- StorageWorks Enterprise Backup Solution (EBS)

Additional information may be obtained from the Compaq website at http://www.compaq.com/products/storageworks/announcements/W2k-Datacenter.html.

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Software

The Compaq Data Center Solution includes a large variety of software products, Compaq support software and third-party software, to meet your data center needs.

Third-party Software

The Compaq Data Center Solution supports all third-party software containing the Windows 2000 Datacenter logo. Passing applications are included in the Microsoft Hardware Compatibility List (HCL) (http://www.microsoft.com/hcl/default.asp) and listed on the Compaq Data Center website (http://www.compaq.com/datacenter).

Compaq Support Software

Compaq provides value-added software products to manage and optimize your data center environment as discussed in the following sections.

Compaq Support Paq for Microsoft Windows 2000 Datacenter Server

The Compaq Support Paq for Microsoft Windows 2000 Datacenter Server, an advanced software delivery tool, includes an installer that analyzes system requirements and automatically installs applicable drivers, utilities, agents, and services based on this analysis.

Compaq Intelligent Manageability Software

Systems configured with Compaq Management Agents are more reliable than the same systems without them.

Compaq Intelligent Manageability software offers IT professionals reliability and stability with their Compaq hardware so it was only natural that Intelligent Manageability play a key role in the new Compaq Data Center Solution. The Compaq Data Center Solution includes the Compaq Management Agents, provided in the Compaq Support Paq for Microsoft Windows 2000 Datacenter Server, and Compaq Insight Manager XE.

Compaq Insight Manager XE leverages the power of the Internet to provide web-based systems management, and is the essential enabler for the Compaq vision of virtual presence. Compaq Insight Manager XE reduces systems management cost, improves operational efficiency and effectiveness, and minimizes systems downtime. It provides device management capabilities that consolidate and integrate management data from Compaq and third-party devices using SNMP, DMI, and HTTP. With Compaq Insight Manager XE, you can monitor and manage groups of servers, clients, clusters and networking products anywhere, anytime from a standard web browser.

Additionally, the Remote Insight Board Lights-Out Edition, a standard option with the ProLiant 8500 Data Center model, provides IT administrators with full graphical access to Compaq servers through a client browser, providing total control of servers in all of their operational states. Designed and priced to provide remote server management in corporate data centers and remote sites, Compaq Remote Insight Lights-Out Edition allows browser access to Compaq servers through a seamless, hardware-based, OS-independent graphical remote console. Since it is hardware-based, it does not require any additional software or use any host server CPU cycles. Other features include a virtual power button, DNS/DHCP IP auto-configuration, and ROM-based configuration capability.

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Cluster configurations include the Compaq Intelligent Cluster Administrator, an advanced cluster utility that provides web-enabled cluster administration and Single Point of Control for MSCS clusters. The new version, 2.1, includes advanced support for 4-node clusters made possible with Microsoft Windows 2000 Datacenter.

You can get more information on Compaq Intelligent Manageability products through http://www.compaq.com/manage/index.html.

Implementing the Compaq Data Center Solution

These sections provide information on installing and implementing the Windows 2000 Datacenter Server operating system on Compaq Data Center Solutions. Step-by-step installation instructions and troubleshooting tips are provided along with the do's and don'ts for the entire Compaq Data Center Solution.

Installation

Step-by-step installation instructions for the Compaq ProLiant 8500 Data Center Server are provided in the following sections.

Installing the Compaq ProLiant 8500 Data Center Server

The Compaq factory-installed software for Windows 2000 Datacenter Server is

- Ready to install. You will be guided through a Setup Wizard, after which any Compaq specific components are installed and, where possible, configured. After any required restarts of the operating system, the Windows 2000 Datacenter Server installation completes and prepares for any required user configuration.
- Pre-configured with default networking protocols, including the Transmission Control Protocol/Internet Protocol (TCP/IP) with DHCP and the Simple Network Management Protocol (SNMP) service. The SNMP service is required for networking and allows the Compaq Management Agents for Servers to communicate with Compaq Insight Manager and Compaq Insight Manager XE. These defaults may be changed through Network Properties after the install completes.

Notes:

- Windows 2000 Datacenter Server requires TCP/IP.
- Complete installation instructions can be found in the *ProLiant Cluster HA/F500 Administrator Guide*.

- Capable of providing out-of-the-box management of the server through the installation of the Compaq Survey Utility and Compaq Management Agents for Servers. The agents monitor the performance of your servers and configuration along with the performance of the operating system.

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The agents help prevent problems before users are affected by issuing alerts when faults occur. The Compaq Management Agents are installed during the setup process. The Compaq Survey Utility is available as an icon on the desktop for installation after the initial Windows 2000 Datacenter Server setup completes.

- Preconfigured with the New Technology File System (NTFS). Many new features in the Windows 2000 Datacenter Server require NTFS, such as promoting the server to a domain controller to utilize Microsoft Active Directory. NTFS also offers greater security. To properly configure the server and to understand how to use NTFS with Windows 2000 Datacenter server while concurrently using previous versions of Windows NT in a network infrastructure, visit the Microsoft online help and Compaq websites.

Note: Complete the operating system installation before installing any additional hardware options. If prompted for Compaq driver files, direct the path to **C:\CPQDRVRS**. Driver files are located in subdirectories in this path. Click the **Browse** button to view the directory.

Factory-Installed Operating System Installation Completion

This section provides instructions for completing the installation of the factory-installed operating system.

Verifying the Certificate of Authenticity

The Certificate of Authenticity (COA) label is located on the top access panel of the server. The 25-character Product Key located on the COA label is required during the server operating system installation.

Record the Product Key in the space provided in Figure 4 during the initial installation of the server.

Your Server's Product Key

_____

Figure 4. Server product key record

Powering Up the Server

Connect the server hardware as described in the server setup and installation guide before powering up the server.

IMPORTANT: Do not install additional certified hardware devices until after the software installation completes.

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To complete the installation of the factory-installed operating system and to configure the server:

1. Power up the server and carefully follow the online prompts, making keyboard or mouse entries only when prompted by the system. Several status windows appear describing the processes that are occurring during the software installation.

   CAUTION: The server requires a reboot at the end of the installation. Do not power down the server at any time during the installation process. Any power interruption during the installation process could prevent proper completion of the configuration and might prevent the operating system from restarting.

2. Type **C** at the Compaq Welcome screen to continue with the installation, or type **V** to view the original server configuration. After typing **C**, the server software license screen appears. Read all software license agreements provided with the server.
3. Type **A** to accept the license agreements and continue the installation. The setup process begins. Follow the instructions on the screen and allow the entire setup process to complete, including any requested restarts. Do not interrupt this process or power down the server. After the initial setup has completed, the server can be configured to meet your individual needs.

Found New Hardware

If the Found New Hardware Wizard opens during the operating system installation, click Cancel. Do not proceed with the installation of drivers until after the second logon, when the operating system is fully installed.

IMPORTANT: If driver installation is attempted during the operating system installation, the server may automatically reboot before the driver installation completes. This could result in incorrect installation of the device.

Note: Due to some driver installation needs, the system may complete the driver installation after the first required logon. Do not perform any actions on the Configure Your Server screen. If additional drivers are loaded, the system will complete the driver installation and automatically reboot. The next time the system presents a logon prompt, log on normally and proceed to use the new operating system.

Some parts of the setup process are automatically configured, and these screens do not display. In the future, if any preconfigured information needs to be changed, refer to the operating system online help for instructions. Of the screens that are automatically configured, the following information may require later changes:

- Licensing Mode—The Server License mode is set at the factory for Windows 2000 Datacenter Server. If additional licenses were purchased, apply them after the initial operating system installation completes.

  Refer to the online help or the operating system documentation for information on adding licenses.

- Administrator Password—The administrator account password has been left blank intentionally. Change the password immediately after the software installation is complete. The administrator password can be changed during the initial setup when entering the

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Computer Name. If the password is changed at that time, remember the new password to log on after the initial setup completes. If the new password is forgotten, the operating system will have to be reinstalled.

Post Operating System Installation Tasks

This section provides instructions for tasks required after the software installation completes.

Note: When installing additional components on the server, the Microsoft Installer Package (MSI) may request the path to the Windows 2000 Datacenter Server CD-ROM. Direct the installer to C:\I386.

Changing the Administrator Password

After completing the initial software installation, log on to the server.

1. Press **Ctrl+Alt+Del** to display the logon screen. Enter the user name **Administrator**.
2. Leave the password field blank if you did not provide one during the installation process and click **OK**. If you provided a password during the installation process, type the password and click **OK**.

Change the administrator password at this time by completing the following steps:

1. Click **Start** to display the Start menu.
2. Select **Programs → Administrative Tools**.
3. Click **Computer Management**.
4. Expand the System Tools directory, then expand the Local Users and Groups directory.
5. Click the **Users** folder.
6. Right-click **Administrator**, which displays on the right side of the window, and select **Set Password**.
7. Type the new password in the New Password field, and then retype it in the Confirm Password field.
8. Click **OK** to complete the process.

CAUTION: Do not lose or forget the administrator password. This password is required to reconfigure the server.

Refer to the operating system documentation for more information on changing the administrator password.

Completing the Compaq Remote Insight Board Installation

The Compaq Remote Insight Board comes preinstalled in the server. The driver is installed during the operation system installation. After the operating system installation is complete, check for the following error messages.

Error Messages

After the Compaq Remote Insight Board driver installs, the following errors occur:

- In the Device Manager screen, two entries will display for the ATI Video Controller. One of these entries will have a yellow exclamation mark indicating that no driver is installed.

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- In the Event Viewer, the following message displays:

  Unable to map address range for graphics card

These errors occur because the Compaq Remote Insight Board and the server are using the same video controller. The operation of the server is not affected by these error messages.

Disable one entry for the ATI Video Controller to prevent the error messages from occurring.

1. Right-click the Device Manager entry for the ATI Video Controller, displaying a yellow exclamation mark.
2. Click **Disable**.

   After the ATI Video Controller entry becomes disabled, or when the server restarts, a red X displays in place of the yellow exclamation mark. This indicates that the device is disabled. The disabled entry does not affect the operation of the server.

Creating Logical Drives

The primary logical drive, which contains the operating system, is the only drive set on the server that has been configured. Additional space that is not partitioned is also located on the primary drive set. This non-partitioned space must be partitioned and formatted before it is available for use.

To create logical drives from the remaining unconfigured drive space, run the Compaq Array Configuration Utility. The Array Configuration Utility is installed during the operating system installation process.

Note: The hard drives are preconfigured by the factory to the appropriate RAID level for operation. Do not use the Array Configuration Utility to change the RAID configuration.

To run the Array Configuration Utility:

1. Click **Start** to display the Start menu.
2. Select **Programs → Compaq System Tools**.
3. Select **Compaq Array Configuration Utility**.
4. Configure the remaining physical drive space into logical drives, and run Disk Management to partition and format the additional drive space.

Refer to the Array Configuration Utility help file for more information on using the Array Configuration Utility.

Formatting and Partitioning the Logical Drives

The following steps use Disk Management to format the logical drives.

1. Click **Start** to display the Start menu.
2. Select Programs, Administrative Tools.
3. Select **Computer Management**.
4. Expand the Storage directory, then click **Disk Management**. The disk and logical drive information displays on the right side of the window.

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- If the new logical drive created by the Compaq Array Configuration Utility does not appear on the bottom right side of the Computer Management window as unallocated space, click **Action**, then click **Rescan Disks**.

5. Right-click on the Disk 1 box, which displays a small red circle on the hard disk icon, on the bottom right panel, then click **Write Signature**.
6. Select **Disk 1**, then click **OK** on the Write Signature screen. The small red circle should disappear and the disk should be identified as a Basic disk.
7. Right-click the box containing the disk size amount and labeled as Unallocated, to the right of the Disk 1 box. Click **Create** from the pop-up window.
8. Click **Next** when the Create Partition Wizard window appears.
9. Select Primary partition, then click **Next** at the Select Partition Type screen.
10. Click **Next** to use the maximum disk space, or enter a desired amount for the partition size at the Specify Partition Size screen.
11. Click **Next** to accept the drive letter assigned by default at the Assign Drive Letter or Path screen.
12. Select File System Type, Allocation Unit Size, and Volume Label at the Format Partition screen.
13. Click **Next**.
14. Click **Finish** at the Completing the Create Partition Wizard window. The partition will be formatted and labeled Healthy at the completion of the formatting process.

Refer to the operating system documentation for more information on configuring the new hard drives.

Note: Repeat steps 5 through 14 for all new additional logical drives.

Installing Approved Hardware Options

The Compaq ProLiant 8500 Data Center server has special requirements for installing supported hardware options. In most cases, drivers for the ProLiant 8500 Data Center server are preloaded for the supported hardware options. For the most current list of approved ProLiant 8500 Data Center server options and option installation instructions, visit the Compaq website:

http://www.compaq.com/datacenter

Backing Up the Server

After you complete the Windows 2000 Datacenter Server installation and the server is operational, back up the server using an approved tape backup system and software.

For product and installation information for the solution offered by VERITAS, visit the VERITAS website, http://www.veritas.com/us or the VERITAS NetBackup™ DataCenter product page, http://www.veritas.com/us/products/nbux/.

Registering the Server

Register the server online at http://www.compaq.com/register

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Installing Compaq Support Software

The Compaq Support Paq for Microsoft Windows 2000 Datacenter Server automatically installs when the server software installs. This software contains device drivers, agents and utilities that take advantage of specific capabilities offered on Compaq products. These drivers are provided for use with Compaq hardware only. To run the Compaq Support Paq for Windows 2000 Datacenter Server:

1. Click **Start**, then click **Run**.
2. Type:

   C:\CSP\SETUP.EXE

   Select the components to update or to install, then click **Install**.
3. Follow the instructions on the screen to complete the installation.

Updating the Compaq Support Software

The latest software enhancements and fixes available for the Compaq Data Center Solution are posted on the Compaq Data Center Support Software website.

To obtain the appropriate Compaq support software for your system, follow these procedures:

1. Go to the Compaq Data Center Software Download Center website (http://www.compaq.com/support/files/datacenter/us/index.html).
2. Select your server from the Family drop-down list box, select **Microsoft Windows 2000 Datacenter** from the Operating System drop-down list box, and click the **Go** button. This procedure takes you to the Locate page, listing the available software by categories.

   Click the appropriate category link for the software you want to download (see Table 3 for category contents).

   Table 3. Software by category contents

Category	Software
Bundles (Drivers and Agents)	Compaq Support Paq for Microsoft Windows 2000 Datacenter Server
Display	Video drivers
Management Agents	Compaq Foundation Agents, Compaq NIC Agents, Compaq Server Agents, and Compaq Storage Agents
Management Applications and Utilities	Compaq Remote Insight Board software and Compaq Survey Utility
Network	Network interface controller drivers and configuration utilities
Storage	Array controller drivers and StorageWorks Fibre Channel HBAs
System ROMPaqs/BIOS	System ROM/BIOS
Utilities	Compaq Integrated Management Log Viewer, Compaq Integrated Management Display Utility, Compaq Cluster Verification Utility, Compaq Power Down Manager, Compaq Power Supply Viewer, Compaq Remote Monitor Service, etc.

3. Click the software version link listed in the Current Version column.
4. Follow the online instructions to download the selected software.

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Restrictions

Since Compaq delivers a complete certified solution for data centers, there are certain restrictions implied regarding platforms and options as discussed in the "Data Center Do's" and "Data Center Don'ts" sections.

Data Center Do's

With the Compaq Data Center Solution, you can:

- Apply quick fixes resolving specific issues as directed by Compaq (Compaq must agree to certify these fixes before you can apply them).
- Install your system configuration from scratch using the Compaq Data Center Solution ProLiant 8500 Data Center Server External Recovery CD-ROMs.
- Keep a configuration for up to two years without being required to upgrade in order to receive support.
- Add more hardware instances (up to the certified number) using the same firmware and/or drivers versions used on hardware instances in original configuration.

Note: The Datacenter verification tool must be run following any configuration change. The output from the tool must be sent to the Data Center Support team if there is an escalation process. This includes both software and hardware configuration changes. This is also part of the on-going relationship between the Compaq Technical Account Manager (TAM) and you to proactively ensure that configuration changes have not happened inadvertently.

Data Center Don'ts

With the Compaq Data Center Solution, you cannot:

- Apply uncertified Microsoft Service Packs or Compaq Support Paqs.
- Add any uncertified kernel-touching components (drivers, agents, DLLs, etc.).
- Install uncertified hardware components.

Troubleshooting

The following sections provide troubleshooting tips for the Compaq ProLiant 8500 Data Center Server.

Troubleshooting the Compaq ProLiant 8500 Data Center Server

One troubleshooting tip for the Compaq ProLiant 8500 Data Center Server involves reinstalling the operating system. These instructions, tested in the Compaq Data Center Solutions Lab, are provided in the sections that follow.

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Reinstalling the Operating System

If the server operating system becomes corrupted, reinstall it using the Compaq Data Center Solution ProLiant 8500 Data Center Server External Recovery CD-ROMs.

Using the Compaq Data Center Solution ProLiant 8500 Data Center Server External Recovery CD-ROMs

The Compaq Data Center Solution ProLiant 8500 Data Center Server External Recovery CD-ROMs contain the system partition and the software image that was installed by the factory on the ProLiant 8500 Data Center server you purchased. Use the software recovery CD-ROMs only when it is necessary to return the system to its original configuration.

Note: Only Compaq trained technicians should perform this restoration.

CAUTION: The software recovery CD-ROMs are intended for use only on ProLiant 8500 Data Center servers with Microsoft Windows 2000 Datacenter Server installed. Attempts to use these CD-ROMs on other servers will fail.

Restoring the Data Center ProLiant 8500 Software

Complete the following procedure to restore a ProLiant 8500 Data Center server to its original configuration.

Note: Begin at step 1 if your ProLiant 8500 Data Center server is connected to a Compaq Modular Array 8000 (MA8000) or Compaq Enterprise Modular Array 12000 (EMA12000) storage system. If your ProLiant 8500 Data Center server is not connected to a MA8000 or an EMA12000, then start at step 2.

---

1. Label and remove any MA8000/EMA12000 cables from your ProLiant 8500 Data Center server.
2. Power up the ProLiant 8500 Data Center server and insert the first software recovery CD-ROM.
3. Select **Continue** from the initial Welcome screen.
4. Select **Continue** from the Warning screen.

Note: Selecting Continue causes the following utilities to run, erasing ALL data from the ProLiant 8500 Data Center server:

- System Erase
- System Configuration
- Array Configuration Utility

CAUTION: The System Erase Utility completely clears the system of all configuration information, software, and data and prepares the system for hardware configuration and software restoration.

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5. Cycle power to the ProLiant 8500 Data Center server when directed. Be sure to leave the first software recovery CD-ROM in the CD-ROM drive.

   The System Configuration Utility and the Array Configuration Utility automatically reconfigure the ProLiant 8500 Data Center server. The Array Configuration Utility executes after the System Configuration Utility completes. This process takes a couple of minutes.

   The ProLiant 8500 Data Center server reboots after the configuration completes.

6. Leave the first software recovery CD-ROM in the CD-ROM drive.

   The ProLiant 8500 Data Center server reboots from the first software recovery CD-ROM. The download software displays a screen indicating that the download process is about to begin.

7. Select **Continue** to transfer the Compaq System Partition to the hard drive.

   After the Compaq System Partition has been installed, the download software displays a screen indicating that the download process for the operating system is about to begin.

8. Select **Continue** to transfer the operating system to the hard drive.

   The operating system image spans two CD-ROMs.

9. Insert the second software recovery CD-ROM, when prompted, and press any key to complete the operating system image transfer.

10. Remove the CD-ROM, when prompted, and press any key to reboot the ProLiant 8500 Data Center server to start the operating system installation.

11. Follow the instructions on the screen and use the instructions provided under the "Implementing Compaq Data Center Solutions" sections to complete the operating system installation.

    The software on your ProLiant 8500 Data Center server is now restored to the original configuration that was installed at the factory, with one exception. During the factory installation, a report is generated that shows the hardware configuration at the time of purchase. When you received the ProLiant 8500 Data Center server, you could view the report when the ProLiant 8500 Data Center server was first powered up. The image you have just installed does not contain this report.

12. Reconnect any MA8000/EMA12000 cables to the ProLiant 8500 Data Center server.

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Appendix A–Compaq Web Resources

Table 4 lists the Internet links noted throughout this document as well as additional links that you might find helpful when investigating Compaq Data Center Solutions.

Table 4. Compaq resources

Item	Web Location
Compaq Data Center Solutions website	http://www.compaq.com/datacenter
Kernel-Touching Applications Explanation and Process (see the kernel-touching components link)	http://www.compaq.com/solutions/datacenter/application.html - kernel
Compaq Data Center Software Download Center	http://www.compaq.com/support/files/datacenter/us/index.html
Windows 2000 on Compaq	http://www.compaq.com/partners/Microsoft/Windows2000/index.html
*Windows 2000 Advant*age Online Magazine	http://www.windows2000advantage.com
Microsoft Frontline Partnership	http://www.compaq.com/partners/Microsoft
White Papers and Other Technical Documentation (complete listing)	http://www.compaq.com/support/techpubs/whitepapers/index.html

Appendix B-Microsoft Web Resources

Throughout this paper, we have discussed Microsoft certification procedures and requirements. After you visit the Compaq Web resources, refer to the Microsoft Windows 2000 Datacenter Server website for additional tools and information critical to your evaluation process. Table 5 lists Microsoft resources on the Web.

Table 5. Microsoft resources

Item	Web Location
Windows 2000 Datacenter Server	http://www.microsoft.com/windows2000/datacenter/default.asp
Windows 2000 Datacenter Server Help documentation	http://windows.microsoft.com/windows2000/en/datacenter/help/default.asp
Windows 2000 Datacenter Server Certified Applications	http://www.microsoft.com/windows2000/datacenter/evaluation/features/software/certified.asp
Windows 2000 Datacenter Server Certified Logo	http://msdn.Microsoft.com/certification
Windows 2000 Datacenter Server Hardware and Software Compatibility Testing	http://www.microsoft.com/windows2000/server/howtobuy/upgrading/compat/default.asp
Microsoft Hardware Compatibility List (HCL)	http://www.microsoft.com/hcl/default.asp

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